

# Space News

# ROUNDDUP!

VOL. 1, NO. 23

MANNED SPACECRAFT CENTER, HOUSTON, TEXAS

SEPTEMBER 5, 1962

## Bids Open On Phase Two Of Clear Lake Work

### Manned Space Flight Weather Unit Moves In

A new office, staffed with personnel from the National Meteorological Center, has opened in room 110-B of Houston Petroleum Center.

Its title is Manned Space Flight Weather Group, and its function is to coordinate all meteorological requirements involved in planning and design of manned spacecraft, and affiliated areas such as the eventual selection of an earth landing site for manned spacecraft.

Acting chief of the new office is Alan Sanderson, for the past several years a principal meteorologist with the National Meteorology Center (Weather Bureau) in Washington, D. C.

Sanderson, a native of Vermont, graduated from Worcester (Mass.) Polytechnic Institute with a BS Degree in Chemical Engineering in 1943, and has been with the weather bureau ever since.

"In those days, graduates in chemical engineering were supposed to be particularly suited for weather work; at least that was the popular idea," he said. "For one thing, we got an exposure to almost all fields of science and engineering."

In addition to Sanderson,  
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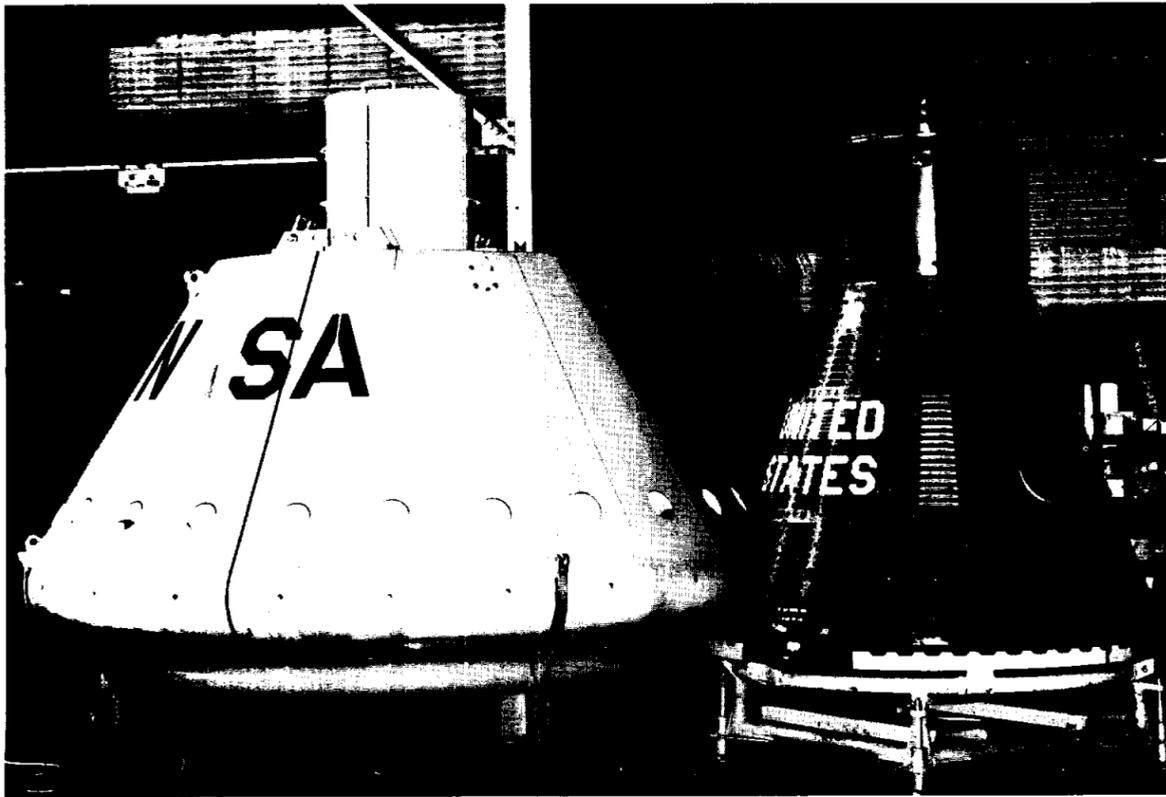
### Non-Members Of Group Insurance Can Enroll Now

An "open" enrollment period for those full time, permanent employees who did not enroll for NASA's group life insurance during their first 90 days of employment is being held from now until Sept. 21.

The open period presents an opportunity for employees to increase their families' life insurance protection without straining their budget, without red tape, and without even a medical examination.

Some employees may have held off buying the additional insurance protection they need because the cost of an individual policy seemed too high. Now these personnel can buy that protection at group rates they can afford through the

(Continued on Page 2)



**THE FIRST BOILERPLATE mock-up of the Apollo spacecraft command module was delivered to Manned Spacecraft Center recently, built by the Space and Information Systems Divisions of North American Aviation, Inc. It has undergone preliminary drop tests on water and handling tests and will be subjected to further water and ground tests at MSC including developmental testing of water recovery procedures. The test structure has the external size, shape and center of gravity of the actual command module.**

## Technical Personnel Take A Look At Emerging Model Of Gemini

Approximately 140 representatives of Manned Spacecraft Center, six other NASA Centers, NASA headquarters, the U. S. Air Force and various industrial contractors gathered at McDonnell Aircraft Corp., St. Louis, Mo. Aug. 15 and 16 for the Project Gemini Engineering Mock-up Review.

The two-day session was the first en masse close-up look at the rapidly emerging model of America's two-man orbital spacecraft, the next major step in the bid for the national goal.

Besides 32 personnel from MSC, the conference was attended by representatives of Langley Research Center, Marshall Space Flight Center, Goddard Space Flight Center, Flight Research Center (Edwards, Calif.), Lewis Research Center, and Launch Operations Center at Cape Canaveral. Representatives were present from Lockheed Missile and Space Co., North American Aviation, Martin-Marietta, and Aerospace, Inc., as well as personnel from the Space Systems Division, USAF Systems Command and the Bu-

reau of Naval Weapons, St. Louis, Mo.

"The purpose of such a meeting is to call in those with experience in this and related fields in order to make use of their experience," Gregory McIntosh, of Gemini Project Office, recorder for the meeting, explained.

"We listened to suggestions

### Saturn Stage Two Engines Test Fired

First test firing of six clustered liquid hydrogen liquid oxygen rocket engines which will power the second stage of the Saturn C-1 space vehicle has been successfully completed at the Douglas Aircraft Company's facility in Sacramento, Calif.

The 10-second firing at a peak thrust of 90,000 pounds, marks the beginning of S-IV development firings which will lead to static firings of the first actual flight vehicle. The first flight test of the S-IV stage is planned for 1963 at Cape Canaveral, Fla.

ranging from the minute details, such as the placing of instrument displays, to major design changes. Dozens of things have to be taken into consideration; for instance, we had some X-15 test pilots present who presented suggestions on visibility. This was the first rough look; later there will be design engineering conferences, examination of first the unmanned and then the first manned spacecraft, and so forth."

Astronaut Virgil I. "Gus" Grissom and a McDonnell engineer donned some of the first prototypes of the Gemini space suit and climbed into a mock-up of the spacecraft, demonstrating movements, reaching for switches, "reading" instrument displays as if in flight.

They demonstrated methods of crew entrance to the spacecraft, crew suit pressurization, re-entry module attitudes including vertical launch attitude, horizontal and intermediate attitudes, adapter equipment accessibility in pad

(Continued on Page 2)

### Invitation Date Set For Phase Three, Control Center

Bidding for "Phase Two" of additional site development on the permanent Manned Spacecraft Center at Clear Lake was opened to prequalified bidders last Thursday in the Crystal Ballroom of the Rice Hotel in Houston.

Meanwhile, invitations for bids on Phase Three, the "big package," are presently scheduled to be issued about Sept. 25 by the U. S. Army Corps of Engineers, Fort Worth District, according to an announcement made by Col. R. P. West, District Engineer.

Invitations for bids on the foundation, structural steel frame and roof for the Integrated Mission Control Center building will be issued about Sept. 11.

Phase Two, which was originally to include an office building, shop and warehouse building and garage along with necessary paving and utility work, was later changed to exclude the office and warehouse buildings, but does now include Building 12, the Data Processing Center, as well as the sewage disposal plant, cooling and heating plant, fire station and garage. The approximate value of the proposed construction under Phase Two is \$5 million.

The opening of bids for Phase Three is scheduled about Nov. 2. Work under Phase Three includes ten buildings of various types, totaling approximately 760,000 square feet in area, with an approximate value estimated at over \$10 million.

Overall completion of the work proposed under Phase Three is scheduled for Feb. 15, 1964 in incremental completion of various buildings.

Bids for the construction of the foundation, structural steel frame and roof of the Mission Control Center will be opened on or about Sept. 27. Work under this contract will call for construction of foundation and structural steel framing including the roof, consisting of about 2,500 tons of structural steel, 50 to 75 tons of reinforcing steel, 1,500 cubic yards of concrete, 3,000 cubic yards of stripping and excavation, and 9,000 cubic yards of back-fill.

(Continued on Page 7)



SOME 1,500 TECHNICAL and scientific representatives attended the MA-7 Results Conference at the Rice Hotel's main ballroom August 21. Above is the press conference held afterward in the Colorado Room. Seated left to right are John Boynton, of Mercury Project Office; J. J. Donegan of Goddard; Dr. C. A. Berry, Aerospace Medical Operations Office; Kenneth S. Kleinknecht, Mercury Project Officer; Walter C. Williams, MSC associate director; Director Robert R. Gilruth; Astronaut M. Scott Carpenter; Maxime A. Faget, assistant director for research and development; J. A. O'Keefe of Goddard; John D. Hodge, Flight Operations Division; and William O. Armstrong, Flight Crew Operations Division. Standing behind Gilruth is MSC Public Affairs Officer John A. Powers.

## Gemini Mockup Conference Views Emerging Spacecraft

(Continued from Page 1)

white rooms and reaction control system module brazing.

In the Gemini mock-up room, participants in the conference review saw displays of the re-entry module, retrograde adapter, equipment adapter, Agena docking adapter, aerospace ground equipment models and prototypes of Gemini pressure suits.

The conference kicked off Aug. 15 with introductory remarks by McDonnell president D. S. Lewis and MSC Director Robert R. Gilruth. Associate MSC Director Walter C. Williams introduced members of the NASA Mock-up Board including Dr. Gilruth; Williams, the chairman; Grissom; J. A. Chamberlin, Gemini Project Manager; M. A. Faget, assistant director for research and development; Christopher C. Kraft, chief of Flight Operations Division; Dr. Stanley C. White, chief of Life Systems Division; G. Merritt Preston, chief of Preflight Operations; Gregory McIntosh of Gemini Project Office, recorder; and two members from NASA Headquarters, George M. Low, director of Spacecraft and Flight Missions and J. S. Shea, deputy director for Systems.

R. N. Lindley, Gemini engineering manager for McDonnell, introduced the McDonnell personnel and opened a discussion of group schedules and request for alterations procedures.

Personnel from Gemini Project Office, MSC then toured the mock-up area and reviewed displays, as the other

conferees heard W. F. Burke, vice president and general manager for Mercury and Gemini programs at McDonnell, give a general description of the spacecraft and systems.

Following lunch, the conferees reassembled in the mock-up area for a series of demonstrations.

Later, various groups of conferees took a tour of spacecraft manufacturing facilities, saw a reactor control system module brazing demonstration, and held technical discussions of Gemini systems.

Following submission of recommendations for alterations, the NASA Mock-up Board convened to review the recommendations.

The review continued the next morning, followed by a joint review of recommendations by a NASA-McDonnell Board, which continued until adjournment in late afternoon.

## Two Firms Named To Make SATAN

Two California firms have been named by NASA to provide research, development and production services for a dynamic new scientific satellite data acquisition antenna called SATAN (Satellite Automatic Tracking Antenna).

Dalmo-Victor Company, Belmont, California and Amelco, Inc., Los Angeles, California, are the suppliers selected to participate in negotiations for an initial 10 systems leading to definitive contracts estimated at \$1,250,000.

## Insurance

(Continued from Page 1)

NASA Employees Benefit Association. Female employees are eligible for the same amounts of insurance as the men.

The plan, which is underwritten by the Home Life Insurance Company of New York, went into effect more than 10 years ago. Steady increases in benefits, and, during recent years, periodic premium rate reductions, have been enjoyed by the members. The face amount of insurance in force on the lives of NASA employees is in excess of \$102,000,000.

## WELCOME ABOARD

Manned Spacecraft Center acquired 48 new employees Aug. 5-22, all except six to be stationed in Houston.

*Off. of Assistant Director for Administration:* Robert W. Cantwell (White Sands, N.M.)

*Mercury Project Office:* Wanda F. Beckelman.

*Gemini Project Office:* Ruby L. Lorenz, Richard B. Hervig, and Mary P. Irvin.

*Apollo Project Office:* Margaret I. Morgan (White Sands, N.M.) and Joseph F. Cook, Ann M. Bilan and Robert H. Ridnour (all in Downey, Calif.)

*Spacecraft Research Division:* Kenneth L. Thomas.

*Life Systems Division:* Joyce L. Lowe and Almeda P. Wilson.

*Systems Evaluation and Development Division:* Robert J. Wren, Edward E. Williams, Sr., Clarence E. Propp and Darryl L. Getman.

*Preflight Operations Division:* William C. Bradford (Cape Canaveral).

*Flight Crew Operations Division:* Arthur Assadourian, Louie G. Richard and Peggy R. Evans.

## Northrop Completes Qualification For Parachute Landing System

Northrop Corporation—Ventura Division has completed qualification of the parachute landing system to be used in the National Aeronautics and Space Administration's Project Mercury Manned one-day mission spacecraft flight scheduled for 1963.

Under contract to McDonnell Aircraft Corporation, Northrop Ventura has designed and produced the landing systems used in all Project Mercury manned and unmanned orbital and sub-orbital flights.

The new qualifying tests were necessary to ensure that the tried and proven Mercury ringsail parachute landing system was satisfactory for the added weight required to sustain an astronaut during the one-day mission. Because of this added weight, new reefing parameters were tested and proven for the system. The main 63-foot ringsail parachute will remain in a reefed condition for two seconds longer than the systems used to land all of America's astronauts who have accomplished space flights.

Twenty successful aerial drop tests, utilizing a full scale test vehicle, were conducted at the Department of Defense Parachute Facility, El Centro, California, in qualifying the landing system.

During the week of Sept. 10, non-members of the plan may attend meetings to be conducted by Home Life representatives at the various MSC sites. At that time the plan will be fully explained, amounts of insurance and rates discussed and the opportunity to enroll afforded the non-members. MSC employees at Cape Canaveral may attend meetings conducted by Home Life representatives in that area on Sept. 6 and 7.

Those employees who are not members of the plan are urged to enroll during the "open" period.

## Lunar Logistics Study Works On Supply Problem

The National Aeronautics and Space Administration has begun studies to determine whether an unmanned lunar logistics system will be required to support manned landings on the moon.

Studies will be by both NASA field centers and industry. Proposals from industry have been requested for two three-month studies.

Dr. Joseph Shea, Deputy Director (Systems) of NASA's Manned Space Flight Office, emphasized that Apollo manned missions are not dependent on the lunar logistics system.

"The in-house and contract studies are being undertaken to define a system which will improve man's capabilities on the lunar surface," Shea said, "but a final decision to develop a lunar logistics system has not been made."

Proposals were requested from industry by Aug. 20 for two separate studies—one of a spacecraft bus which could carry the support payloads to the moon and the other of a variety of payloads which could be soft-landed near the Apollo manned missions.

The first study will be of a spacecraft bus concept which could be adapted for initial use on the Saturn C-1B and later use on Saturn C-5 launch vehicles with a minimum of modification.

The Payload study will be limited to potential performance of seven specific payloads. The objectives of the payload study are to determine how man's stay on the lunar surface might be extended either on an emergency or planned basis, how to increase men's capability for scientific investigation of the moon, and how to increase his mobility on the lunar surface.

The following logistics support payloads will be considered:

Crew stay-time extension, crew shelter, roving vehicle, lunar surface modification equipment, power station equipment, communication station equipment, multiple purpose payload.

Twenty-four companies received the spacecraft bus proposal request and twenty-eight firms received the payload proposal request.

**JOIN THE  
MSC  
CREDIT UNION**

*Audit Office:* Woodrow W. Gavenda.

*Flight Operations Division:* Capt. Henry E. Clements and John P. Bryant.

*Public Affairs Office:* James M. Grimwood.

*Health and Safety:* Shell E. Martin.

*Aerospace Medical:* Capt. Richard A. Pollard.

# Details Of New Site Buildings Show Where Divisions Will Be

Details of the arrangement of various buildings in MSC's new permanent site at Clear Lake were released recently in near-final form, as the bid invitation date for Phase III of the construction was set.

The new facilities, budgeted at \$120 million, will house all activities of the Center from management offices to cafeterias, and will include a Mission Control Center which will direct manned Gemini and Apollo flights.

The site consists of about 1,600 acres situated 22 miles from downtown Houston. Initial occupancy is planned for January 1964.

The auditorium building, (1 in the map below) will be a two-section, single story structure housing in addition to an auditorium a display area, the Public Affairs Office and certain Personnel and Security Division offices. The auditorium itself will seat about 800.

The 2500-square-foot stage area will have adequate light and electrical power source for television coverage of major news events at MSC, and there will be press room facilities and a TV control room outside the main auditorium area.

The second section of the building will provide office space for the Public Affairs Office as well as some branches of Personnel, Security and Procurement. Still and motion picture editing rooms, a film library and photo storage will also be housed there.

The Project Management Building (2), a nine-story administration complex, will provide space for the executive offices, project engineering offices, Financial Management, Procurement, Personnel, Administrative Services, and the MSC communications center.

This building will serve as the control and general support center for the entire complex and is centrally located for this reason.

The new site will be served ultimately by two cafeterias, one located within the main building complex and the other in the Technical Services-environmental test area. The main cafeteria (3) will serve as the supply and preparation kitchen for the second cafeteria (3a).

The main building is designed to serve approximately 500 people during each half-hour lunch period, with three serving lines for hot lunches and one for short orders. In addition to the general dining area, there will be an executive dining room seating approximately 45.

Located behind the cafeteria will be the three-story office building for the Flight Operations and Flight Crew Operations Divisions, and the bio-instrumentation laboratory of the Life Systems Division (4).

In addition to space in this building, the Life Systems Division will be provided with a laboratory building to house test equipment (5). Included in the high bay area of this facility will be drop towers similar test facilities, as well as the work areas for test payload preparation.

Surrounding the high bay area will be supporting laboratories, including the space suit lab, environmental systems instrumentation lab, a chemistry lab, and a material and survival equipment lab.

The Technical Services building (6) will be the central management headquarters for both the Technical Services Division and the Facilities Division.

The photo laboratory to be housed in this building will provide a central photographic

processing department for the entire center. Graphic Arts Services will also occupy part of this facility. All phases of illustration and printing are to be performed here, including reproduction services in photolithography, diazo duplicating and photostating.

A dispensary, staffed by a physician and two nurses, will also be provided in this building.

The shop area for Technical Services (7) will contain a machine shop, chem-mill, and finishing foundry and heat treating, electronics, model making, metal fabrication and assembly areas essential to the construction of wood, plastic and metal spacecraft prototypes.

The 60-foot-clearance High Bay facility, equipped with a bridge crane, will provide the capability to receive and handle all contractor-furnished spacecraft for special adaptation necessary before testing in other facilities.

The two-story Central Data Building (8) will house the Technical Information Office and the technical library as an active source of technical information.

The Data Computation Division will also occupy part of this facility, and both analog and digital computers will be installed.

The systems evaluation laboratory (9) will house equipment and provide space for conducting experimental investigations on advanced materials, spacecraft structural components and complete structural assemblies.

Research and development offices and laboratories (10) will be housed in one building to concentrate the engineers and project leaders of the Electrical Systems Branch of Systems Evaluation and Development Division.

In addition, this building will contain equipment and facilities for several electronic labs, a high bay area, and environmental qualification lab, white rooms and associated lab areas.

The Spacecraft Research Building (11) will contain the offices and various labs of the Spacecraft Research Division. Special lab areas for onboard navigational equipment, spacecraft configuration and spacecraft design will be provided. The Building will also contain analog and digital computer equipment and a mock-up area for the construction and display of model mock-ups of spacecraft, launch vehicles, etc.

This facility will also house a seismic isolation lab for optical sighting of Polaris for basic astro determinations.

In addition to the various

## Federal Accountants Group To Form Chapter In Houston

A local chapter of the Federal Government Accountants Association is to be formed in Houston of persons in Federal service who have administrative and policy advisory responsibilities in areas of accounting, budgeting, auditing and similar financial management operations.

This is a national professional organization whose aims are: (1) advancement of accounting for improvement of Federal financial control, (2) research in financial management techniques, and (3) attainment of a higher quality in the caliber of Federal Government financial managerial personnel. There is in excess of 4,000 members in approximately 40 chapters including Anchorage, Alaska; Canal Zone; Paris, France; and Tokyo, Japan.

J. K. Bember of the Corps of Engineers in Galveston, and R. H. Voigt of Manned Spacecraft Center, have been the prime movers in the initiation of this organization. Voigt was formerly president of the San Antonio chapter.

The local group expects to receive its charter and hold its initial meeting on Sept. 18. Representatives from the Washington, D.C. chapter will attend the ceremony and the San Antonio chapter expects to send a contingent.

On August 14, a meeting was held at the Ellington AFB Officer's Club for the purpose of getting acquainted and appointing a nominating committee for the new organization. There were 42 persons present, representing seven agency offices in the Houston area. The organization nucleus consists of 12 members to be transferred from other chapters and 17 new member applications. A nominating committee of the following was appointed for the purpose of making up a slate of four officers and five directors: C. H. Branch, Jr., US Army, Audit; Woodrow Rasco, Manned Spacecraft Center, Financial Management; George W. Newsom, Jr., US Air Force, Auditor General at Ellington AFB.

## Apollo Heat Shield Support Panels Ordered From Aeronca

The first set of stainless steel, honeycomb panels for the Apollo Spacecraft has been ordered from Aeronca Manufacturing Corp., Middletown, Ohio.

The contract for panels was awarded Aeronca by North American Aviation's Space and Information Systems Division, principal contractor for NASA's Apollo Spacecraft. The award was made on a "cost plus incentive fee basis." Amount of the definitive contract is being negotiated.

The panels, part of a sub-

office buildings and laboratories to be constructed, MSC is planning to build a Flight Accelerator centrifuge (14) for testing the effects of high G levels on men and equipment. The centrifuge will be a multiple usage facility: 50 per cent will be used by the Flight Crew Operations Division for astronaut training; 25 per cent will be used by the Life Systems Division or biomedical research of the effects of G forces on man; and 25 per cent will be used for testing spacecraft and spacecraft systems under heavy G loads.

The arm of the centrifuge will be between 40 and 60 feet long with a load capacity of

## Industry Comm.

(Continued from Page 8)

poses is of value for practical commercial application in the civilian industrial economy.

"It is our objective to insure that developments resulting from NASA's scientific and technological programs be retrieved and made available to the maximum extent for the nation's industrial and consumer benefit in the shortest possible time," Webb said.

structure that supports the ablative heat shield material, are scheduled for delivery early next year.

Twelve major contracts totaling more than \$115 million for Apollo Spacecraft systems have been awarded to companies in seven states. More than 2,000 firms are expected to participate in the program.

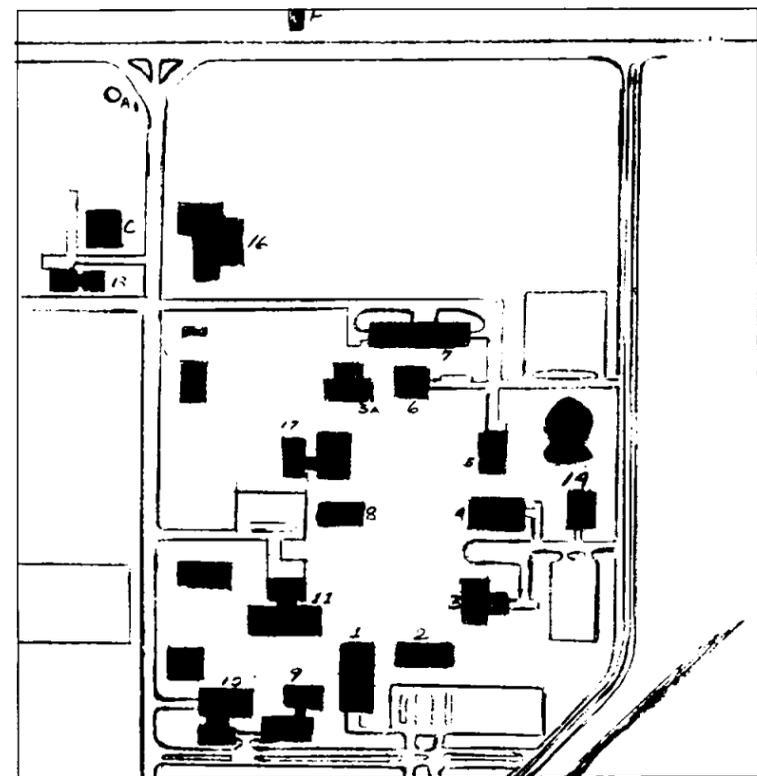
approximately 3,000 pounds. Present studies are investigating an adaptable arm to accept a complete Apollo command module mock-up for testing. A rapidly interchangeable gondola system will allow a maximum of three men to undergo centrifuge training at the same time.

The centrifuge will be built with a capability of expansion for future MSC projects.

A thermo-chemical test area (not shown) will be constructed at the center to test, evaluate and conduct developmental work on spacecraft propulsion, reaction control and energy-conversion systems and sub-systems.

A space environment simulation chamber (16) will be constructed to conduct space environment testing of spacecraft and astronauts. This facility will consist of two chambers—the larger one 65 feet in diameter and 120 feet high; the smaller one 35 feet in diameter and 43 feet high.

The chambers will have the capability to produce temperatures as low as -300° F. and a vacuum of 10-5 mm. of mercury.



THIS PARTIAL site map shows only the main building area of Manned Spacecraft Center facilities to be built at Clear Lake. Numbers correspond to building descriptions in the above story.

# NASA's Goddard Space Flight Center Is Hub of Two World-



FROM LAUNCH AT CAPE CANAVERAL until the spacecraft is recovered a mass of raw data relating to the spacecraft's performance pours into the computing system at Goddard. IBM 7090 computers capable of making millions of calculations a minute flash this data via high speed circuits to Cape Canaveral where flight controllers make the vital decisions regarding conduct of the mission.



THE NASA COMMUNICATIONS CENTER, manned around the clock every day, is the hub of NASA communications. Goddard SFC is in constant communication with the world-wide satellite tracking network and other support functions.

Thirty-seven major satellite projects underway, two world-wide tracking networks, and a team of 2,400 scientists, engineers, technicians and supporting personnel—this is NASA's Goddard Space Flight Center.

GSFC is the first major United States laboratory devoted entirely to the investigation and peaceful exploration of space.

The Center, located some 10 miles northeast of Washington, D. C., is responsible for complete development of unmanned sounding rockets and earth orbiting spacecraft experiments in basic and applied science. The work covers scientific satellites and communication and weather satellites which orbit in cis-lunar space. In addition Goddard is the communications hub for two world-wide tracking data acquisition and data reduction networks. The Center also

manages NASA's Delta rocket.

Center Director is Dr. Harry J. Goett.

At Goddard, scientific disciplines which heretofore had gone their separate ways with only occasional interactions, now tackle, in close partnership, the problem of understanding the phenomena and properties of outer space. Here physicists, astronomers, geodesists, mathematicians, geologists, engineers, and many others explore the innermost workings of the universe.

The Center is named after Dr. Robert H. Goddard, American pioneer of rocketry.

#### Goddard Scientists Study Outer Space

The regions being studied by Goddard Scientists can be divided into three general areas of interest.

The first concerns the sun itself. One objective of Goddard's sun-earth studies from

satellites is to observe details and effects of sunspots and solar flares which are a basic cause of many weather and communications phenomena.

The second study area is interplanetary space. This region is dominated by the sun, and relatively uninfluenced by the earth. Here it is possible to observe the sun's electromagnetic radiations and the actions of solar particles essentially unaffected by the earth's magnetic field.

The third region being investigated is the near-earth region called the magnetosphere. This is a region in which the magnetic field of the earth exerts a major influence.

Typical Goddard-managed spacecraft associated with basic research are sounding rockets and space probes, satellites of the Explorer series, Orbiting Geophysical Observatories, Orbiting Astronomical



AN AERIAL VIEW of Goddard Space Flight Center at (

Observatories, and Orbiting Solar Observatories.

#### Weather Satellites

The meteorological satellites include three major projects, the Tiros, Nimbus and Aeros satellite systems, which will progressively improve monitoring and prediction of worldwide weather conditions and man's understanding of meteorological activity. These satellites provide information on earth's cloud cover, storm locations, temperature and heat balance. Goddard's program is concerned not only with the spacecraft, but with on-board equipment to obtain and handle the data and satellite-to-earth communication systems.

Though experimental, the series of Tiros (Television Infra-red Orbiting Satellite) weather satellites has already provided valuable advance warning of typhoons and hurricanes.

The Center's staff takes considerable pride in the fact that Tiros V, launched in June, represents the ninth consecutive successful launch (out of ten) for the Goddard-managed Delta launch vehicle.

Next year, Nimbus, successor to Tiros, will be launched. It will be even more versatile. Its cameras will be directed continuously at the earth. Also, cameras for Nimbus will have a higher resolution than those in Tiros. At night, infra-red radiation sensors will be used to record cloud formations.

Beyond Nimbus is the Aeros program, conceived as a meteorological satellite system of three units, placed above the equator in so-called "stationary orbits," thus making 24-hour weather observations possible.



Dr. Harry J. Goett  
Director, GSFC

#### Communications Satellites

Goddard's communications satellites consist of the passive Echo-type system and active repeater satellites: Relay and Syncom.

The Echo projects explore the feasibility of light-weight, uninstrumented, inflatable spheres as "passive" reflectors of radio and other electronic signals. Active communication satellites will contain on-board electronics—a receiver and amplifier and a transmitter which amplifies the signal before re-broadcasting it back to earth. Solar cells will operate the electronic equipment aboard the spacecraft.

The Relay project consists of medium altitude, active communications satellite experiment undertaken in cooperation with Great Britain, France, Germany, and Brazil.

The Syncom satellite will be an active repeater system, stationed in a 24-hour orbit, thus remaining constantly over one region.

#### Sounding Rockets

An important area of Goddard research is carried out with sounding rockets. These

# Wide Tracking Networks; Has 37 Satellite Projects Underway



Greenbelt, Maryland, showing facilities existing in June 1962.

vehicles are used to conduct experiments in and beyond the earth's atmosphere; they also serve as "test beds" for instrumentation to be flown in satellites. It is part of a broad research program embracing American industry, government, universities and other nations.

Sounding rockets are usually launched from Wallops Island Virginia, Woomera, Australia or from Ft. Churchill, Canada.

A scientific and communications satellite is not a mass-produced item, but usually a one-of-a-kind spacecraft containing a complex array of the most delicate scientific and electronic equipment.

At Goddard, scientist, engineer and technician work as a team on the design, fabrication and testing of scientific and application satellites.

Manufacture of space vehicles is accomplished either "in-house" by the Center's own staff or under contract, using the know-how and talents of American industry through a combination of these efforts.

Once fabricated, Goddard's test facilities help assure that the payload will survive the tremendous stresses of launching and will operate efficiently in space.

A complex, labeled as Goddard's new Payload Test and Space Environment Facilities will serve as a large scale laboratory to test Goddard-developed satellites, payloads,

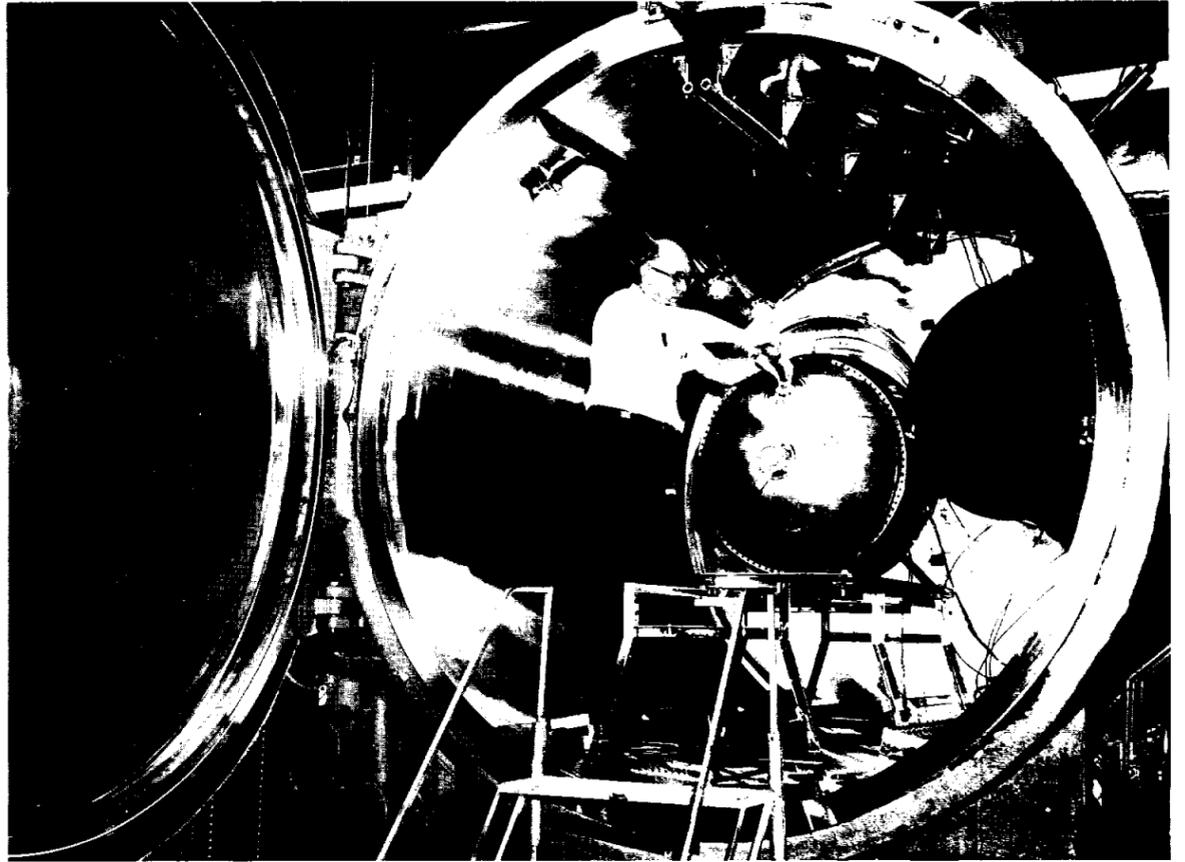
and probes. These facilities which are now being completed, will be able to handle one 4,000 pound payload, plus two 1,000 pound loads simultaneously. Here, a spacecraft may be exposed to both the vacuum and solar radiation stresses of its future environment. Conditions such as extreme temperature, humidity, shock, vibration and structural loading may also be simulated to assure that Goddard-developed payloads can take the punishment which they will face on orbital missions.

The laboratory will be able to test any payload capable of being launched by an Atlas-Agena vehicle. Goddard's OAO, (Orbiting Astronomical Observatory) OGO, (Orbiting Geophysical Observatory) and Nimbus weather satellite are slated for testing here.

#### Tracking & Data Acquisition and Reduction

A satellite with the finest scientific instruments, launched perfectly into orbit, is worthless unless it can be tracked to determine where it is, and scientific information can be received and recorded on the ground. Then the data, recorded on magnetic tape, must be reduced into facts and figures in order that the scientist can analyze the results of his space-borne experiments.

To accomplish this task, Goddard Space Flight Center serves as the tracking and communications hub of NASA's



THE ATMOSPHERIC STRUCTURE SATELLITE S-6 will be launched into earth orbit to study the composition, density, pressure and temperature of the upper atmosphere. It is shown here being readied for tests in a thermo-vacuum chamber at Goddard.

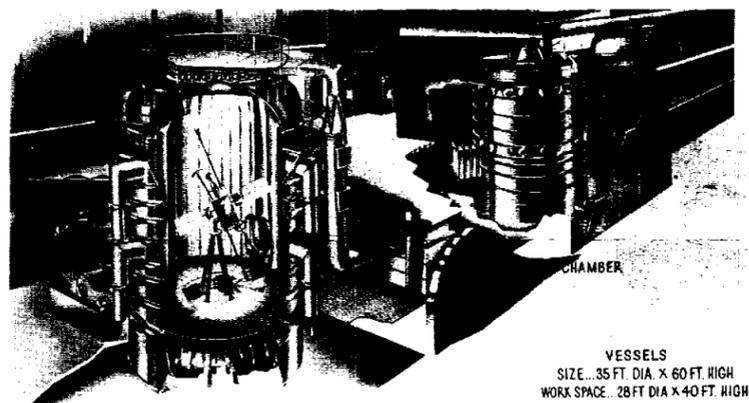
World-Wide Minitrack and Mercury Networks.

The 13 Minitrack stations which serve as "eyes and ears" for unmanned scientific satellites provide precision tracking, command and telemetry data to the Communications Center at Goddard. The stations are located at Blossom Point, Maryland; Fort Myers, Florida; Quito, Ecuador; Lima, Peru; Antofagasta, Chile; Santiago, Chile; Woomera, Australia; Johannesburg, South Africa; Goldstone Lake, California; St. Johns, Newfoundland; East Grand Forks, Minnesota; Fairbanks, Alaska and Winkfield, England.

A wide-band data acquisition network is being added to provide for multiple band width communications. With new satellites, each carrying numerous scientific experiments soon to "inhabit" outer space, a wide band network is needed, capable of transmitting the vast amount of information to be recorded, hundreds or thousands of miles away.

The first wide band station to be operational is at Gilmore Creek, some 20 miles from Fairbanks, Alaska. It has a huge 85 foot parabolic antenna. A similar station is also being constructed at Rosman, North Carolina. An additional installation is planned for the Far East. Each station costs about \$5,000,000, is ultra-sensitive and must be entirely removed from interference due to noise, radio and airways. The Gilmore station is expected to get its first work-out in connection with the Nimbus weather satellite, a Goddard project slated for launch later this year.

For Project Mercury operations as well as for future manned exploration of space such as Project Apollo, Goddard has designed and operates



AN ARTIST'S CONCEPT of test chambers currently under construction at Goddard. The chambers will be used to pre-flight test NASA spacecraft.

a global ring of stations which provide vital tracking, telemetry, and ground voice communications on a "real-time" basis. The focal point of this integrated communications system is Goddard's Space Control Center which determines and predicts satellite orbits, reduces scientific and biomedical data, and commands a voice network, called SCAMA, linked to stations in the Mercury Network. Dual high speed computers, each with a "real-time" channel, make constant flight contingency recommendations, predict flight path, impact point of the capsule as well as velocity vectors on a near-instantaneous continuous basis during the mission. These computers, in the simplest mathematical explanation, can add, for instance, a column of 10-digit numbers 3/4 of a mile in length every second.

Altogether, Goddard's Mercury system involves approximately 60,000 route miles of communications facilities to assure an integrated network with world-wide capability for handling satellite data. It comprises 140,000 actual circuit miles—100,000 miles of teletype, 35,000 miles of tele-

phones, and over 5,000 miles of high-speed data circuits.

**Institute for Space Studies**  
As a key element of its scientific staff concentrating on basic theoretical research, Goddard has established the Institute for Space Studies in New York City.

The institute emphasizes broad areas of astronomy, physics and the earth sciences, with particular attention to physics of the earth's interior; meteorology; physics of the upper atmosphere and ionosphere; plasma physics and its applications to the interplanetary plasma; gravitational astronomy; including celestial mechanics in geodesy, and stellar structure and evolution.

The Institute reaches into the staffs and graduate student bodies of space-interested colleges and universities. Its location near the campus of Columbia University, enables the Institute to draw on the talents of Columbia, New York University, City College of New York, Brooklyn Polytechnic Institute, Yale, and Princeton. The Institute has also attracted, on a consultant basis, leading scientists from throughout the United States and the free world.

**Editor's Note:** This is the first of a series of features concerning the activities and functions of other NASA installations. This series is being run in order to acquaint MSC personnel with the contributions of those Centers to the overall United States space effort and to give a better understanding of the close working relationship between all the NASA installations. The information was supplied by the GSFC Public Affairs Office.

The SPACE NEWS ROUNDUP, an official publication of the Manned Spacecraft Center, National Aeronautics and Space Administration, Houston, Texas, is published for MSC personnel by the Public Affairs Office.

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## EDITORIAL EXCERPTS

The Washington Post  
 August 18, 1962

### EARTHLY GERMS MAY POLLUTE MOON

BLACKSBURG, Va., Aug. 17 —Microorganisms carried by Soviet and American lunar vehicles may contaminate the moon and could foredoom all hope of identifying life there.

This is the conclusion of Carl Sagan of the University of California, who made a plea today that such contamination be avoided. The scientist expressed his views at the closing session of a Conference on Lunar Exploration at the Virginia Polytechnic Institute here.

Last year Sagan said indigenous life in the form of microorganisms may exist on the moon if certain conditions are being met there. These conditions require the microorganism to be shielded from the sun's deadly radiation, at a depth beneath the lunar surface where there is water and a moderate temperature.

Although the chances of an earthly "bug" surviving on the moon's surface "are literally nil," Sagan said, one might "fall through crannies" into an environment that is favorable to living forms. If this were to happen, he said, a single earthly bug could multiply so fast that a manned lunar expedition might find "nothing but terrestrial microorganisms."

In this case, Sagan said, scientists would find it difficult to arrive at any valid conclusions about life on the moon.

Sagan said microorganisms from the earth have already been deposited on the lunar surface, carried there aboard Soviet and American moon probes. He estimated that one million microorganisms were contained in the fuel from the American vehicle's retro rockets.

This does not mean, Sagan noted, that the moon is already contaminated. The terrestrial bugs may not have survived in their new environment.

Sagan also warned against the dangers of "back contamination," in which either new lunar life forms or altered terrestrial forms are brought back to earth from the moon. He cited the devastating epidemics caused by explorers who carried venereal disease from the Old to the New World and measles to Polynesia.

Evidence for the existence of such material, which does not necessarily constitute life, has been found in a Soviet observation of cold carbon gas spewing from a particular lunar crater.

The presence of organic material on the moon would provide clues to the moon's history, as well as that of the solar system.

## MSC PERSONALITY

### Technical Asst. Don Gregory Has Had Short, Busy Career

"Young man on the way up" might describe Donald T. Gregory, technical assistant to the director, who has not yet reached his 29th birthday.

But Gregory, whose hometown is Cleveland, Ohio, has packed a lot of experience into his short lifetime. A graduate of the University of Miami, class of '55, with a B.S. in Mechanical Engineering, he held various summer jobs during his college years and went to work immediately after as an aeronautical research engineer with NACA at Langley.

He was working with static stability and performance

continue his work in the unitary wind tunnel.

Gregory was engaged in research involving the determination of the force and stability characteristics of swept-wing and canard-type aircraft at supersonic speeds.

His experimental work also included tests of re-entry nose cone and missile configurations in supersonic flows.

During his stint at Langley, he was senior author of four and co-author of five NASA reports. On the four tests in which he was senior author, he served as project engineer. In investigation of supersonic impact nose cones, he supervised the design of the models, supervised data reduction, followed model construction and set up the test program, as well as operating the tunnel during the test.

In May of 1959, Gregory ended his three-year tour of duty with the Air Force, but stayed right at Langley Research Center. He joined Space Task Group in September of 1959 and was assigned to the Contracts Section, where he managed the engineering administration work for the Training Aids Section.

He coordinated the preparation of requirements, technical specifications and work statements for the egress trainer and procedures trainer, evaluating the contractor's firm cost and delivery proposals for these devices.

In 1960, Gregory was transferred to the Project Engineering Branch and was assigned the task of updating MA-2, MA-3 and MA-4 mission directives. He also prepared technical information summaries for MR-1, MR-1A and MA-2 missions, developing a new type of report that presented in condensed pictorial form the essential facts concerning each mission, and modifying and improving the format of the report.

In the summer of 1961, he spent some time in St. Louis, Mo. working with McDonnell Aircraft Corp. on Project Orbit, a series of altitude chamber tests with the Mercury Spacecraft. Last October, in his own words, "they asked me if I'd come up here as a technical assistant, and I said sure—so here I am."

Gregory has "one wife, Patricia, and three children," Karen, 4, John D., 3 and Dean, who reached his first birthday last Wednesday.

His hobbies, he says, "used to be handball, and I used to water-ski two or three times a week, but I've only been once this summer. Right now the family hobby is looking at houses."



Donald T. Gregory

characteristics in the supersonic wind tunnel at Langley when, in the spring of 1956, he joined the Air Force. For a year he was given pilot training at various bases, most of them in Texas, and in June of 1957 was returned to Langley, assigned by the Air Force to

### Purser Speech

(Continued from Page 8)

able horizontal velocity on the skid-type landing gear."

"The magnitude of our manned lunar landing program is so great as to severely tax our imagination; however, I believe in this light the significant differences in this and our Mercury program are clearly evident, whether the comparison be drawn as to the cost, the human resources, the duration of the mission or the expenditure of the energy to do the job.

"To accomplish our goal, we must call upon the resources of government, industry, and indeed the entire nation. The costs are great, in both money and human effort. However, we are not spending any of this in space or on the moon. The money needed for these programs is spent right here in these United States.

"One thing is certain—space will be explored. It has to be. The same kind of curiosity has led man to explore other unknowns for many generations prior to this and if we do not do it, others will."

## On The Lighter Side



### Eyeballs In Or Out?

If you happen to overhear a fellow explaining he was "eyeballs in," don't assume he was cockeyed.

For chances are he'll be one of the new linguists of the Space Age, speaking a growing language that already ranges from "A-Okay" (meaning all systems working perfectly) to "Zero-G" (the state of weightlessness).

In this argot of the astronautical world, "eyeballs in" means the direction of the pressure caused by great acceleration, such as a take-off.

"Eyeballs out," of course, is the opposite pressure under deceleration.

Aerojet-General Corporation practitioners of the new nomenclature point out that in many cases men of the Space Age simply grasp the handiest coinages of the moment to describe their world.

"Blowoff," for example, might sound like the loud-mouth of the launch site, but really means separation of a payload from the rocket by an explosive device.

"Gimbal" is not the kind that wouldn't tell Macy—it means to swivel a rocket's nozzle to alter its course.

"Sitting Fat" is not an innuendo that somebody needs the hip course at Vic Tanny's—it means in orbit with everything working fine—or A-Okay.

"T-Time" is not an afternoon break with crumpets. It's when the button is pushed to launch a missile.

And a "Sunseeker," regrettably, is not a nifty in a bikini. It's a gadget to keep instruments aimed at the sun.

—Cartoon by Pete Bentovoja, Los Angeles Examiner.  
 Copy by Don Bailer. Reprinted courtesy of Aerojet-General.

## Credit Union's Membership Jumps To 310 By Mid-August

The MSC Federal Credit Union is "growing like a weed" in the words of manager Joseph P. Murray, having gone from 259 members at the end of July to 310 in the first three weeks of August.

Current total assets in mid-August exceeded \$55,000, whereas on July 1 they were only \$31,500.

"We are now in a position to make car and boat loans not to exceed \$4,000, with proper security," Murray commented. "The credit committee meets Monday, Wednesday and Friday, and we are clearing loans on a money-available basis.

"We can also help people with necessary paperwork in transferring car titles from Virginia to Texas," Murray pointed out, "if they are members of the Credit Union."

The board of directors has been enlarged from seven members to nine with the addition of Jack A. Kinzler and Thomas J. Porter; and the credit committee increased from three to five members with the addition of James F.

Moody and Sidney Carmines.

Some 98 loans are presently outstanding, representing \$45,965 in funds.

Site representatives who can receive memberships and take loan payments have been selected for the following sites:

At Ellington AFB, Ivan Nachman, Building 363; at the Rich Building, James F. Moody, Room 135; at University of Houston (KHOU-TV) L. C. Krehnak, Room 214; at Office City, Virginia Cook, Room 109; at HPC, Gladys Pierce, Room 155, B Section; at Minneapolis Honeywell, Jan Simmons; at East End State Bank Building, Sandra Hall. Others will be announced as soon as appointments are confirmed.

The next meeting of the board of directors is scheduled Tuesday of next week.

## Motorola Is Selected To Develop Gemini Digital Command System

Motorola's Military Electronics Division—Western Center has been selected by McDonnell Aircraft Corp. to develop the digital command system for the Gemini two-man orbital space vehicle. The Gemini program is under the technical direction of Manned Spacecraft Center.

The Motorola digital command units will be installed in the spacecraft where they will receive command signals from the ground and convert the signals for control of various spacecraft systems. The equipment consists of r-f command receivers, decoders and a buffer storage unit.

Proven hardware items, such as the Motorola command receivers successfully employed in the Mercury Program, will be used in order to meet very high reliability requirements that specify a mean time between failure of approximately 17,000 hours. A similar approach will be applied to the digital equipment, using Motorola circuit modules and packaging methods employed in the Mariner Program.

Motorola will also supply aerospace ground equipment.

## Melpar To Build Beacon Antenna For Apollo Craft

Melpar, Inc., of Falls Church, Va., has been selected to build a research and development beacon antenna system for the National Aeronautics and Space Administration's Apollo spacecraft.

The Melpar System will be used in early Apollo Program Research and Development Vehicles. It will provide for the transmission of beacon signals for ground tracking purposes during early unmanned flights of the Apollo. The Apollo Spacecraft will transport the first Americans to the moon for Lunar exploration before 1970.

## Weather Office

(Continued from Page 1)

two other men will form the staff of the weather group as soon as they are selected. There will be another meteorologist, who is a specialist in extraterrestrial environment, or "space weather," and a space physicist.

The office has been staffed with weather personnel on temporary duty more than a month, but the permanent staff is now being selected.

"Right now we will be coordinating all meteorological requirements for planning and design of manned spacecraft," Sanderson said, "But later on, when the Integrated Mission Control Center is built, we will be handling inquiries about statistics concerning weather for the selection of landing areas on the earth."

For the benefit of those personnel who made need the services of the Weather Group, the telephone extension is 3224.

## Lewis Center's Space Chamber Simulates Moon — And Further

Engineers at NASA's Lewis Research Center in Cleveland, Ohio, have reached the moon and possibly beyond without moving a foot off of the Earth's surface.

This extreme altitude figure has been achieved through construction of a space chamber which provides a vacuum environment in the laboratory equivalent to conditions on the moon and further into space, according to Dr. Herman Mark and Ralph D. Sommers, Lewis engineers associated with the Apollo program.

"The three important elements of actual space environment reproduced in the Lewis chamber are thermal energy, near perfect vacuum and the temperature which a vehicle is likely to encounter in space," Mark and Sommers said.

Other space environmental conditions such as zero gravity radiation and meteoric impact will be provided by separate laboratory facilities at Lewis and its center at nearby Plum Brook, Ohio, according to the engineers.

Solar thermal energy — within a hair of that encountered on the sun's surface—is realistically reproduced in the Lewis chamber by burning a modified carbon electrode arc. The required temperature—

453 degrees below zero—and the intense pressure or vacuum is achieved through use of liquid helium. The vacuum quality is the same as the lunar environment, and reaches the astounding low of 10-13 millimeters of mercury. This is a million times lower than most space chambers have been able to achieve.

The Lewis chamber will supply information about possible errors in the less-accurate larger space chambers which can simulate altitudes not much greater than 100 miles. Most orbiting spacecraft flying well above this 100-mile testing limit encounter increasingly lower pressures. In interplanetary space the pressure is more than 10 million times lower than the upper testing limit of other chambers. Considering this margin for error the large tanks could be overlooking something that would only show up in actual flight—too late. The Lewis project was designed to catch such errors before they are made, according to Mark and Sommers.



**MAN'S DRIVE** to achieve long-duration space travel advanced recently with selection of a super-strong fabric for development of a paraglider which will bring spacecraft occupants back to a dry landing on earth. The paraglider fabric is made from DuPont's Dacron Fiber at the J. P. Stevens & Co., Inc. Dunean weaving plant, Greenville, S. C. Here North American Aviation Research Engineer Howard Massey (seated) and Stevens Synthetic Industrial Fabric Department Manager George Ewald examine the woven material following special tests.

## AC Moves Into High Gear For Apollo Guidance Works

General Motors' AC Spark Plug Division has moved into high gear on its portion of the Apollo Program by increasing its technical personnel requirements at both its Milwaukee, Wis., and Boston, Mass. facilities.

AC was selected several months ago as part of the industrial participation team to work with the Massachusetts Institute of Technology in the development of a guidance and navigation system for the spacecraft destined to place this country's first man on the moon.

While AC is under contract to NASA, its role in the program is to augment and supplement the efforts of MIT in the design, development, and checkout of the system. The institute's instrumentation laboratory is charged with the initial responsibility for the design and development of the airborne package.

Heading the AC Apollo Program is Dr. Robert R. Sparacino, who is also director of the GM Division's Wakefield, Mass. Research and

## Site Bids

(Continued from Page 1)

The approximate value of the proposed construction is estimated at one and a half million dollars. The work is scheduled to be completed by the end of January next year.

Phases Two and Three of the construction work at Clear Lake are the second and third major phases in the program. Phase One is presently underway, and includes support facilities for the site such as the 7,000-foot zig-zag untilidor tunnel under the main building area to house lines and pipes for electricity, water, air conditioning and heating for offices and laboratories.

Development Laboratory.

The effort, Sparacino explained, will be divided between the Wakefield Lab, MIT, and eventually the manufacture and subsystem integration will be carried out at AC Milwaukee, Wisconsin Plants.

Thus far 180 employees and their families have been relocated. These include engineering, manufacturing, and reliability personnel.

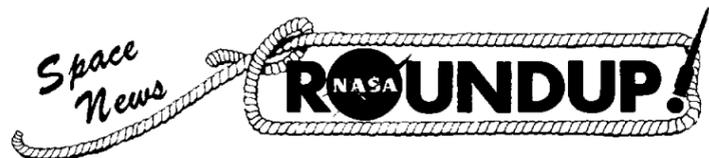
A unique concept called level of effort/LOE has been instituted whereby AC Apollo team members work directly with MIT people and are participating in the design of the system.

The LOE approach provides a completely systems-oriented cadre to facilitate operations once the development and manufacturing phase of the program gets underway, Sparacino added.

Specifically, AC will build and test the inertial platform and associated electronics, and develop and build a guidance ground support and checkout system. It will also be AC's responsibility to integrate other subsystems—optics and digital computer — into the main system.

Present plans call for the ground support equipment mechanization to be handled at the Wakefield Laboratory. The actual design will be done at Milwaukee.

Basically the guidance is a three axis system using single degree of freedom gyros. There are three inertial components — gyros and accelerometers — on platform.



SECOND FRONT PAGE

## Mobile Chest X-ray Van To Visit Sites Next Week

The Houston-Harris County Tuberculosis Association's mobile X-ray unit will visit all NASA sites next Tuesday, Wednesday and Thursday to take chest X-rays of all NASA personnel and their families.

No children under 12 years of age will be included.

A charge of 50 cents per person will partially cover the expenses for the non-profit organization.

On Tuesday, the mobile unit will visit East End State Bank Building, from 8 a.m. until 10; Lane Wells Building between 11 a.m. and 1 p.m.; Canada Dry from 1:30 until 2 p.m.; Minneapolis-Honeywell from 2:30 until 3 p.m.; and the KHOU-TV studio at University of Houston from 3:30 until 4 p.m.

On Wednesday the mobile unit will begin at Stahl and Myers and the Houston Petroleum Center from 8 to 11 a.m.; go from there to Farnsworth and Chambers between 1 and 3 p.m.; and finish up at the Peachy Building from 3:30 until 4 p.m.

Thursday will include a tour of Office City, the Rich Building and Ellington AFB, from 8 to 10:30, 11 a.m. to 2 p.m. and 2:30 until 4:30 p.m. respectively.

Those personnel wishing to have their families, excepting any children under 12, x-

rayed should have members of their families present by the time that the mobile unit is scheduled to arrive at the site in question.

Authorities say it is "now or never" for the drive to eradicate TB. In time, the TB bacillus may be overwhelmingly resistant to the drugs that now slow it down enough to allow a cure. Mrs. Frances Brown, director of the Houston-Harris County Mobile Unit, notes that "The TB Association has kept up an intensive and mass-scale search finding TB and much non-TB chest pathology in all parts of the community and in all ages.

"Top U. S. TB authorities have championed such an all-out search. Their Arden House Report, format for TB fighting in the 1960's, proclaims that TB can be wiped out if all the carriers are found and given modern drug treatment before these antibiotics are neutralized by growing germ resistance.

The visit of the TB X-ray van to MSC sites was arranged by the Personnel Division.



**THIS MOBILE X-RAY VAN will visit all MSC sites Tuesday, Wednesday and Thursday of next week to provide chest X-rays for NASA employees and members of their families over 12 years of age.**

## NASA Appoints Industrial Applications Advisory Unit

An Industrial Applications Advisory Committee has been established in the National Aeronautics and Space Administration, Administrator James E. Webb announced.

Webb said the principal function of the committee will be to assist NASA management in an organized effort to transfer new scientific and technological knowledge from NASA's research and development program to industry.

As chairman, he named Earl P. Stevenson, former president and chairman of the board of Arthur D. Little, Inc., engineering and industrial research company of Cambridge, Mass., now a NASA consultant.

Objectives of the Committee will be: to recommend methods for the identification,

retrieval, evaluation and dissemination of innovations having a high potential for industrial applications; and to assist in the development of procedures for the most effective transfer of technology from NASA research and development programs to the industrial community.

Webb said that much of the extensive new knowledge developed in the nation's intensive research and development program related to the space effort for peaceful pur-

*(Continued on Page 3)*

## Out Of Shape? Here's Chance For Exercise

Employees of Manned Spacecraft Center who sometimes feel they "aren't getting enough exercise" will have a chance to remedy the situation as early as Thursday night.

Some 25 women are already members of a group exercise plan known officially as the "Five BX Plan."

They meet Monday, Tuesday and Thursday nights each week from 5 until 6 p.m. at the gymnasium at Ellington Air Force Base.

The plan was originated by the Canadian Air Force, and included two separate regiments for men and women. It was later adopted by the U. S. Air Force for pilot training.

One of its primary advantages is that anyone can participate, even those affected by such handicaps as a heart condition. The exercise is confined to a limited period and scaled down according to age and physical condition.

Lt. Col. Harry S. Long, (USAF Ret.), Jr., Personnel Services Officer at Ellington, has granted to MSC employees the use of the Ellington gym including the steam room and showers.

The exercises are simple and ideal for a group working together. There are variations for those who want to lose weight and those who wish only to improve muscle tone or re-proportion body contours. There are no fees to be paid at present, although the group is considering hiring a masseuse later if interest permits.

The gym is located directly in the rear of the airmen's swimming pool on Kirk St. at Ellington.

Those wishing to participate may either join the group at the gym at 5 p.m. any Monday, Tuesday or Thursday afternoon, or call Esther Kiel or Louise Timmer in the Commercial Unit, Financial Management, extension 7246, 7247 or 7248.

## This Generation Is Part Of Greatest Revolution Of All Times, Purser Tells Nuclear Space Seminar

"We are living in an age that cannot be paralleled by any preceding one," Special Assistant to the Director Paul E. Purser told the Nuclear Space Seminar which met in Amarillo, Tex. August 28.

"We should be very proud that we are a part of this age and that we have the opportunity to witness the greatest revolution of all times. "It will affect every one of us and the generations to follow us."

Purser's subject was the role that man plays in space both at present and in the future.

Illustrating his address with slides, he described the basic objectives of Project Mercury from October of 1958, when a small group of 37 technicians and engineers were organized into the Space Task Group.

"Project Mercury's first orbital flight marked the end of a three-year long research and development period from which has resulted an operational manned spacecraft, operational techniques, a worldwide tracking and instrumentation network, trained flight and ground crews and

the adaptation of military rockets to manned space flight . . . "The prime contractor for the Mercury program has developed a number of new techniques and processes which should have broad application not only in future manufacture of spacecraft but in many other areas as well.

"The objectives of Project Apollo are to land men on the moon, explore the local vicinity and return the men to earth. Although the objectives may be simply stated, the task is a very difficult one. It is important, however, in any difficult task, to know what the objectives are so that the program energy will not be dissipated in side issues or imaginary needs."

The three modes for accomplishing the Apollo program were discussed, along with the requirements, advantages, and disadvantages of each.

"The overall mission schedule, both for systems development and operation, was, of course, an important consideration. Using a conservative approach, we concluded that the lunar-orbit rendezvous can

accomplish the lunar landing some months earlier than either the earth rendezvous or the direct flight. Therefore, the schedule advantages, cost advantages and the developmental simplicity of the lunar-orbit rendezvous led it its selection as the prime mode."

"The accomplishment of this objective will require a spacecraft-launch-vehicle configuration which will dwarf any we have seen to date."

Purser then described the configuration and its parts, including the lunar landing vehicle.

After reviewing major events in Project Mercury, Purser noted that flights with the Mercury spacecraft will not be terminated yet. We will probably complete such missions by making several one-day flights.

Moving on the Project Gemini, Purser listed its objectives and commented on the appearance and make-up of the Gemini spacecraft, pointing out differences between the Mercury and Gemini spacecraft and explaining the reasons for them.

"It is planned that Gemini will have less automatic sequencing of flight modes than Mercury. Operations with man in the role of mode selector and acting as sensor operator in the rendezvous missions should again provide experience and knowledge that will increase our confidence in the role to be played by man for future programs. The requirements to operate Gemini will do much to improve the development of overall operational procedures."

Discussing system improvements to be utilized in Gemini, Purser emphasized the use of the paraglider "wing" which will be carried folded and uninflated in the small neck of the spacecraft until it is ready for use in the lower atmosphere. When it is deployed and inflated, "the pilot will have the ability to glide to landing strips, counteract rather high winds that would blow a parachute off course, avoid local hazards, and finally perform a flare out maneuver to reduce the vertical velocity to zero and land with reason-

*(Continued on Page 6)*